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# UNDERSTANDING GITHUB

FEATURES, BENEFITS, AND CONCEPTS OF GITHUB AND GIT

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## Table of Contents

Introduction.....	2
What is GitHub? .....	2
GitHub use .....	3
Repositories.....	3
Branches.....	4
Pull request.....	4
What is git.....	4
Differences between git and GitHub.....	5
GitHub Commands .....	5
Conclusion .....	6
Reference .....	6

## Table of Figures

Figure 1 GitHub logo .....	2
Figure 2 git logo.....	4

## Table of Tables

Table 1 Difference between README files and wikis .....	3
Table 2 Differences between git and GitHub.....	5

## Introduction

Developer collaboration on software projects is revolutionized by the web-based platform GitHub. It makes collaboration and version control easier by offering a user-friendly interface for tracking code changes and project management. Because it allows developers to collaborate easily, GitHub is a well-liked option across the world.

We'll look at GitHub's main features and how they improve version control and teamwork. We'll also go over the differences between GitHub and Git and highlight each tool's use in software development.

## What is GitHub?



*Figure 1 GitHub logo*

A web-based platform offers hosting services for Git version control. It makes it possible for groups and people to work together on software development projects, monitor code modifications, and oversee the whole process. Developers around the world can now collaborate more easily thanks to GitHub, which has grown to be one of the most widely used systems for hosting and sharing code repositories.

A cloud-based Git repository hosting service is provided by the for-profit organization GitHub. In essence, it greatly simplifies the usage of Git for version control and teamwork for both people and organizations.

Because of GitHub's user-friendly interface, even inexperienced programmers can benefit from Git. Git typically takes a little more technical know-how and command line usage when used without GitHub.

However, because GitHub is so easy to use, some individuals even use it to handle different kinds of projects, including writing novels.

Additionally, GitHub is particularly well-liked by open-source projects since anyone may register and host a public code repository for nothing.

GitHub is a business that generates revenue through the sale of hosted private code repositories and other business-focused programmers.

## GitHub use

GitHub is a popular platform used for software development and teamwork. It helps developers keep track of changes in their code over time. It allows multiple people to work together on projects, review and suggest changes, and collaborate effectively. GitHub is especially valuable for open-source projects, where developers from around the world can contribute and share their work. It also provides tools for managing tasks, organizing projects, and monitoring progress. By integrating with other tools, it automates processes like testing and deploying code. GitHub also supports hosting project documentation and encourages knowledge sharing. Additionally, it serves as a platform for developers to showcase their work and skills. Overall, GitHub is a user-friendly platform that promotes collaboration, version control, project management, and knowledge exchange in software development [1].

## Repositories

A repository contains all of your code, your files, and each file's revision history. You can discuss and manage your work within the repository [2].

*repositories (or repos) serve as containers for storing and organizing code and related resources. They are the fundamental units of collaboration and version control on the platform.*

common use cases for GitHub repositories:

- **Hosting and managing code:** repositories act as a central location for hosting and managing code, providing robust version control capabilities. Developers can conveniently store and monitor their code modifications.
- **Collaboration:** repositories promote collaboration among developers and streamline the code review process. They facilitate teamwork, allowing multiple contributors to collaborate, review code, and offer feedback.
- **Project management:** repositories come with handy project management features. You can create issues to keep track of tasks, bugs, and feature requests, which helps teams organize and prioritize their work.
- **Sharing:** you can store project documentation, **README** files, and **wikis**. Developers use this feature to share instructions, guidelines, and explanations with other people involved in the project.

Difference between README files and wikis

Table 1 Difference between README files and wikis

README files	wikis
Usually Provides important project information	Usually Contains detailed documentation and guides
Found in the main project folder	Located in the "Wiki" section of the repository

## Branches

Branches allow you to develop features, fix bugs, or safely experiment with new ideas in a contained area of your repository [3].

GitHub branches are copies of a repository's code that let developers work on different versions or features of a project separately. They represent distinct paths of development that branch off from the main codebase, with each branch having its own unique changes and commits.

Commonly uses of branches

- Resolving bugs.
- Try new ideas without affecting the main codebase.
- Multiple developers work on different parts of the codebase simultaneously.

## Pull request

A pull request is a proposal to merge a set of changes from one branch into another. In a pull request, collaborators can review and discuss the proposed set of changes before they integrate the changes into the main codebase. Pull requests display the differences, or diffs, between the content in the source branch and the content in the target branch [4].

A pull request is a GitHub feature that allows developers to suggest modifications for a repository. It's similar to raising your hand to demonstrate to others the changes you've made to a project and asking them to check and maybe apply those adjustments.

Commonly uses of pull request feature

- share their changes with others, seeking feedback, suggestions, and improvements before merging the code into the main branch.
- collaboration among team members.
- When developers are fixing bugs in a branch, they open a pull request to have those fixes reviewed and subsequently merged into the main branch.

## What is git



Figure 2 git logo

"Global information tracker", Git is a DevOps used for source code management. It is a free and open-source version control system used to handle small to very large projects efficiently. Git is used to track changes in the source code, enabling multiple developers to work together on non-linear development [5].

Git is a tool used by developers to keep track of changes and work together on projects. It helps manage the different versions of files and makes it easier to collaborate. With Git, developers can create a local repository on their computer and make changes to files. They can then save those changes as a new version, which Git keeps track of. If needed, developers can go back to previous versions. Git also allows developers to work on different features or experiments at the same time by creating separate branches, and later combining them. Git makes it possible for developers to share their changes with others through remote repositories, making collaboration smoother. It also helps resolve conflicts that may occur when combining different changes. Overall, Git simplifies version control and makes it easier for developers to work together on projects.

## Differences between git and GitHub

GitHub and Git are two connected but different software development tools.

*Table 2 Differences between git and GitHub*

Git	GitHub
<b>Git is a system for keeping track of changes to files.</b>	GitHub is a website where you can store and share your Git projects.
<b>It is a command-line tool</b>	it has a user-friendly <b>website</b> interface
<b>works on your (local) computer.</b>	used through a website.
<b>helps manage code locally.</b>	platform where you can collaborate and share code with others.

## GitHub Commands

It helps perform tasks related to managing and collaborating on GitHub repositories.

Common commands

- git clone [repository-url]: Downloads a remote GitHub repository to your computer.
- Git init: initialize a local Git repository.
- Git add: add file the staging area.
- Git commit -m [commit message]: save changes with descriptive message.
- git push: Sends your committed changes from your computer to a GitHub repository.
- git pull: Retrieves and merges changes from a GitHub repository to your local copy.
- git branch -a: Lists all branches, including both local and remote branches, in a GitHub repository.
- git checkout [branch-name]: Switches to a specific branch in a GitHub repository.

- `git merge [branch-name]`: Combines changes from one branch into the current branch on GitHub.

## Conclusion

In conclusion, GitHub is an essential tool for modern software development. It brings people together, simplifies version control, and makes collaboration a breeze. Whether you're working on an open-source project or your own software, GitHub is a valuable platform that empowers developers and promotes teamwork.

## Reference

1. <https://kinsta.com/knowledgebase/what-is-github/>
2. <https://docs.github.com/en/repositories/creating-and-managing-repositories/about-repositories>
3. <https://docs.github.com/en/pull-requests/collaborating-with-pull-requests/proposing-changes-to-your-work-with-pull-requests/about-branches>
4. <https://docs.github.com/en/pull-requests/collaborating-with-pull-requests/proposing-changes-to-your-work-with-pull-requests/about-pull-requests>
5. <https://www.simplilearn.com/tutorials/git-tutorial/what-is-git>
6. <https://gist.github.com/vimal-verma/6fe59f3b7f886d2210bca28634b3a7fe>